dr. ir. Rein Houthooft

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Summary

Expertise in fundamental AI/ML research, specifically focusing on deep learning, with a strong publication track record. ML engineering and applied research management experience in building high-throughput online recommendation/personalization systems. See reinhouthooft.github.io for a more complete description.

Current position

Head of AI, Happy Elements, Inc. . . . . en.happyelements.com/ai

With over 100 million unique monthly active users, Happy Elements is the producer of one of the largest active mobile games worldwide. In 2018 I joined the company to co-found and co-lead its AI lab with the goal of optimizing mobile gaming experience through machine learning. Since its inception, the team grew to over 20 members, with presence both in Beijing and San Francisco. Through the development of algorithms, systems, and models as well as the supporting production infrastructure, the AI lab is able to significantly impact company revenue by increasing the overall player life-time value and retention.

Areas of specialization

Artificial Intelligence • Machine Learning • Software Engineering

Experience

2017-2018 *Research Scientist*, OpenAI . . . . . www.openai.com
Research into deep reinforcement learning, particularly solving the exploration-exploitation trade-off problem through curiosity-based learning, generative modeling, and meta-learning. Part of my responsibilities also included mentoring research interns within the field. The results of this research were applied to solve to simulated robotics and game playing problems.

2014-2017 *Doctoral Researcher*, imec . . . . . www.imec-int.com
Collaboration project with CNH Industrial to build a computer vision system based on structured prediction to guide autonomous agricultural vehicles.

2016 *Machine Learning Research Intern*, OpenAI . . . . . www.openai.com
Research into deep reinforcement learning and generative modeling.

2012 *Software Engineering Intern*, Solvace . . . . . www.solvace.com
First engineer at the start-up Solvace to build a collaboration platform to facilitate knowledge sharing across businesses. Solvace got acquired by Efeso Consulting.

2011 *Combinatorial Optimization Researcher*, KU Leuven . . . . . set.kuleuven.be/codes
Collaboration project with ArcelorMittal to optimize supply chain logistics using linear programming and meta-heuristics.

Education

2014-2017 *Ph.D. in Computer Science and Engineering* . . . . . Universiteit Gent, Belgium
Research on structured prediction, computer vision, and deep reinforcement learning applied to simulated robotics and autonomous vehicles.

2016 *Visiting Student Researcher* . . . . . University of California—Berkeley, USA
Deep reinforcement learning research with Pieter Abbeel at the Berkeley AI Research Lab (BAIR).

2012-2014 *M.Sc. in Computer Science and Engineering* . . . . . Universiteit Gent, Belgium
2008-2012 *B.Sc. in Industrial Engineering* . . . . . Associatie KU Leuven, Belgium

Publications

Conference articles

2018 Houthooft, R., Chen, R. Y., Isola, P., Stadie, B. C., Wolski, F., Ho, J., Abbeel, P. (2018). Evolved Policy Gradients. In *Advances in Neural Information Processing Systems (NeurIPS)*, Montreal, Candada

Stadie, B. C., Yang, G., Houthooft, R., Chen, X., Duan, Y., Yuhuai, W., Abbeel, P., Sutskever, I. (2018). Some Considerations on Learning to Explore via Meta-Reinforcement Learning. In *Advances in Neural Information Processing Systems (NeurIPS)*, Montreal, Candada

Plappert, M., Houthooft, R., Dhariwal, P., Sidor, S., Chen, R.Y., Chen, X., Asfour, Y., Abbeel, P., and Andrychowicz, M. (2018). Parameter Space Noise for Exploration. *International Conference on Learning Representations (ICLR)*.

2017 Tang, H., Houthooft, R., Foote, D., Stooke, A., Chen, X., Duan, Y., Schulman, J., De Turck, F., and Abbeel, P. (2017). #Exploration: A study of count-based exploration for deep reinforcement learning. In *Advances in Neural Information Processing Systems (NIPS)*, Long Beach, USA

2016 Houthooft, R., Chen, X., Duan, Y., Schulman, J., De Turck, F., and Abbeel, P. (2016). VIME: Variational information maximizing exploration. In *Advances in Neural Information Processing Systems (NIPS)*, pages 1109–1117, Barcelona, Spain.

Chen, X., Duan, Y., Houthooft, R., Schulman, J., Sutskever, I., and Abbeel, P. (2016). InfoGAN: Interpretable representation learning by information maximizing generative adversarial nets. In *Advances in Neural Information Processing Systems (NIPS)*, pages 2172–2180, Barcelona, Spain.

Duan, Y., Chen, X., Houthooft, R., Schulman, J., and Abbeel, P. (2016). Benchmarking deep reinforcement learning for continuous control. In *Proceedings of the 33rd International Conference on Machine Learning (ICML)*, pages 1329–1338, New York, USA.

Houthooft, R., De Boom, C., Verstichel, S., Ongenae, F., and De Turck, F. (2016). Structured output prediction for semantic perception in autonomous vehicles. In *Proceedings of the 30th AAAI Conference on Artificial Intelligence*, Phoenix, Arizona, USA.

2015 Houthooft, R., Sahhaf, S., Tavernier, W., De Turck, F., Colle, D., and Pickavet, M. (2015). Robust geometric forest routing with tunable load balancing. In *Proceedings of the IEEE Conference on Computer Communications (INFOCOM)*, pages 1382–1390, Hong Kong, P.R. China.

2014 Houthooft, R., Sahhaf, S., Tavernier, W., De Turck, F., Colle, D., and Pickavet, M. (2014). Fault-tolerant greedy forest routing for complex networks. In *Proceedings of the 6th International Workshop on Reliable Networks Design and Modeling (RNDM)*, pages 1–8, Barcelona, Spain.

De Backere, F., Hanssens, B., Heynssens, R., Houthooft, R., Zuliani, A., Verstichel, S., Dhoedt, B., and De Turck, F. (2014). Design of a security mechanism for RESTful Web service communication through mobile clients. In *Proceedings of the IEEE/IFIP Network Operations and Management Symposium (NOMS)*, pages 1–6, Krakow, Poland.

Journal articles

2016 Houthooft, R. and De Turck, F. (2016). Integrated inference and learning of neural factors in structural support vector machines. *Pattern Recognition*, 59:292–301.

2015 Houthooft, R., Ruyssinck, J., van der Herten, J., Stijven, S., Couckuyt, I., Gadeyne, B., Ongenae, F., Colpaert, K., Decruyenaere, J., Dhaene, T., and De Turck, F. (2015). Predictive modelling of survival and length of stay in critically ill patients using sequential organ failure scores. *Artificial Intelligence in Medicine*, 63(3):191 – 207.

Houthooft, R., Sahhaf, S., Tavernier, W., De Turck, F., Colle, D., and Pickavet, M. (2015). Optimizing robustness in geometric routing via embedding redundancy and regeneration. *Networks*, 66(4):320–334.

Patent applications

2016 Houthooft, R., Verstichel, S., Debilde, B., and Foster, C. A controller for a working vehicle. E.U. Patent Application No. 16177346.0 - 1905. U.S. Patent Application No. 15/199,090. Filed 30 June 2016.